

CLAIMS

What is claimed is:

1. A set of digital antibodies, wherein the set comprises at least about 15 digital antibodies, wherein each digital antibody binds a different epitope, and wherein each digital antibody binds an epitope consisting of 3 consecutive amino acids, or 4 consecutive amino acids.
2. The set of digital antibodies according to claim 1, wherein the set comprises 100 digital antibodies that bind epitopes consisting of 3 consecutive amino acids.
3. The set of digital antibodies according to claim 2, wherein the set further comprises 100 digital antibodies that bind epitopes consisting of 4 consecutive amino acids.
4. The set of digital antibodies according to claim 3, wherein the set further comprises 100 digital antibodies that bind epitopes consisting of 5 consecutive amino acids.
5. The set of digital antibodies according to claim 1, wherein the set comprises at least about 100, 200, 300, 400, 500, 600, 700 800, 900, or 1000 digital antibodies.
6. The set of digital antibodies according to claim 1, wherein the set comprises at least 1000 digital antibodies that bind epitopes consisting of 4 consecutive amino acids.
7. The set of digital antibodies according to claim 6, wherein the set further comprises at least 100 digital antibodies that bind epitopes consisting of 5 consecutive amino acids.
8. The set of digital antibodies according to claim 7, wherein the set further comprises at least 100 digital antibodies that bind epitopes consisting of 3 consecutive amino acids.
9. The set of digital antibodies according to claim 1, wherein the digital antibodies are immobilized on a surface.
10. The set of digital antibodies according to claim 4, wherein the digital antibodies are immobilized on a surface.

11. The set of digital antibodies according to claim 9 or 10, wherein the surface is an array.

12. A method for generating a protein binding profile, said method comprising:

(a) contacting a sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein; and

(c) detecting binding of protein to antibodies, whereby a protein binding profile is generated.

13. The method of claim 12, wherein the method further comprises the step of treating the sample with a protein cleaving agent prior to step (a) of contacting the sample with the set of digital antibodies under conditions that permit binding.

14. A method for generating a library of protein binding profiles, said method comprising:

(a) contacting a sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein;

(c) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(e) repeating steps (a) through (c) with at least two samples.

15. The method of claim 14, wherein the method further comprises the step of treating the sample with a protein cleaving agent prior to step (a) of contacting the sample with the set of digital antibodies under conditions that permit binding.

16. A library of protein binding profiles, wherein the library is prepared using the method of claim 14.

17. A method for characterizing a test sample, said methods comprising

(a) contacting the test sample with the sets of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein;

(c) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(d) comparing the protein binding profile of the test sample with the protein binding profile of a reference sample, whereby the test sample is characterized by the comparison.

18. The method of claim 17, wherein step (d) of comparing is with a library of protein binding profiles, wherein the library of protein binding profiles is generated using a method comprising:

(i) contacting a sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(ii) optionally removing unbound protein;

(iii) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(iv) repeating steps (i) through (iii) with at least two samples.

19. A method for determining presence or absence of a bacteria, virus, or cell in a sample, said method comprising

(a) contacting the test sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein;

(c) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(d) comparing the protein binding profile of the test sample with the protein binding profile of a reference sample, whereby presence or absence of the bacteria, virus or cell in the test sample is determined by the comparison.

20. The method of claim 19, wherein step (d) of comparing is with a library of protein binding profiles, wherein the library of protein binding profiles is generated using a method comprising:

(i) contacting a sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(ii) optionally removing unbound protein;

(iii) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(iv) repeating steps (i) through (iii) with at least two samples.

21. A method for identifying a bacteria, virus, or cell, said method comprising

(a) contacting the test sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein;

(c) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(d) comparing the protein binding profile of the test sample with the protein binding profile of a reference sample, whereby the bacteria, virus or cell in the test sample is determined by the comparison.

22. The method of claim 21, wherein step (d) of comparing is with a library of protein binding profiles, wherein the library of protein binding profiles is generated using a method comprising:

(i) contacting a sample with a set of digital antibodies according to claim 1 under conditions that permit binding;

(ii) optionally removing unbound protein;

(iii) detecting binding of protein to antibodies, whereby a protein binding profile is generated; and

(iv) repeating steps (i) through (iii) with at least two samples.

23. A method for identifying a test protein, said methods comprising

(a) contacting a sample comprising the test protein with the set of digital antibodies according to claim 1 under conditions that permit binding;

(b) optionally removing unbound protein;

(c) detecting presence or absence of binding of protein to antibodies in the set, wherein at least about six digital antibodies bind protein; wherein presence of binding indicates presence of at least about six epitopes in the protein, wherein the identity of the at least about six epitopes is used to identify the protein.

24. The method of claim 23, wherein at least about 7, about 8, about 9, about 10, about 11, about 12, about 13, about 14, about 15, about 20, or, about 25 digital antibodies bind protein.

25. The method of any of claims 12, 14, 17, 19, 21, or 23, wherein the sample comprises cellular protein or a subfraction of cellular protein.

26. The method according to any of claims 12, 14, 17, 19, 21, or 23, wherein the sample is of a cell or virus.

27. The method of any of claim 17, 19, 21, or 23, wherein the method further comprises the step of treating the sample with a protein cleaving agent prior to step (a) of contacting the sample with the set of digital antibodies under conditions that permit binding.

28. A kit comprising the set of digital antibodies according to claim 1.